

Incidence of Congenitally Missing Mandibular Incisors among Patients with Orthodontic Treatment

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ABSTRACT

Aim: To assess the incidence of congenitally missing mandibular incisors in patients reporting for orthodontic treatment.

Introduction: Hypodontia is the most common condition reported among people. Missing mandibular incisors plays an important role in planning the treatment in the field of orthodontics. The knowledge on the mandibular teeth agenesis and other different tooth positions aids in analyzing the etiological basis of the orthodontic treatment.

Materials and methods: A total of 962 patients' case sheets were taken in the present study. From which, 155 patients were categorized under the orthodontic population and 807 patients under the general population. The prevalence and average missing of the mandibular incisors were analyzed in both the groups using intraoral images and panoramic radiograph.

Results: The prevalence of missing mandibular incisors among orthodontic and general population were 8.38% and 1.11% respectively. Tooth number 31 (50%) is found to be the most commonly missing teeth followed by 41, 32 and 42. Females show a high incidence of missing lower incisors compared to males. And also, females have more missing teeth than males.

Conclusion: Hypodontia is found considerably more frequent in mandibular incisors in orthodontic patients. Early detection of missing teeth can obtain a satisfactory permanent dentition and to reduce the complications of hypodontia.

Key words: Incidence, Innovative approach, Hypodontia, Mandibular incisors, Panoramic radiographs

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INTRODUCTION

Hypodontia is the one of the most common dental anomalies encountered by the dentist in both primary and permanent dentition. Numerous researches were carried out assessing the hypodontia with overall prevalence rate from 0.1 to 10% [1]. The prevalence of hypodontia varies based on geographical locations and races. The incidence of tooth agenesis, excluding third molars in both genders, is reported to be 3.5% among American population, 11.3% among Irish and Solvenian population and 0.3% among Israeli population [2-4]. The different findings could be explained by the variety in the samples examined in terms of age range and ethnicity used for evaluation. Multiple factors are employed for the emergence of hypodontia. A study conducted by Boruchov and Green, Moller et al. and Townsend et al proved that environmental factors may be important in the expression of the trait of hypodontia such as infection, trauma and drugs [5-7]. Another study by

Parkin stated that occurrence of hypodontia is not completely dependent on genetic factors but is supported by the variable expression of hypodontia [8]. Furthermore, it is also suggested that anterior hypodontia may depend more on genetics while posterior missing might be sporadic [9]. The different findings could be explained by the variety in the samples examined in terms of age range and ethnicity used for evaluation.

Assessment of other congenital dental anomalies might be established easily, whereas congenitally missing teeth are not commonly seen through the naked eyes of a dentist due to minimal discrepancy in the other teeth in the arch [10]. Thorough clinical and radiographic examination, care and conservatism must be exercised to arrive at decisions that concerned congenitally missing teeth. The treatment plan is established on the basis of presence of even one congenital missing tooth as it influences the complete profile, masticatory efficiency, and aesthetics of the patient undergoing orthodontic treatment [11].

Many literature analyzed the incidence rates of missing maxillary lateral incisors, maxillary and mandibular premolars [12,13]. So far, studies focused only on either normal individuals or orthodontic patients. Hence in contrast, this study aims to determine the incidence of

missing mandibular incisors among the orthodontic population against a comparable sample of the general Indian population.

LITERATURE REVIEW

This was a retrospective study for a period of 2 months from December 2020 to February 2021. A total of 962 patients were included in this study that visited the Department of Orthodontics between the 18-40 years of age group and were divided into two groups. Group A (N=155) patients undergoing orthodontic treatment. Group B (N=807) patients without any requirement of orthodontic treatment. Informed consent was obtained from all the patients.

Data collection

The case sheets of those patients were verified and recorded the demographic details such as name, age and gender. The number of missing mandibular incisors was analyzed using intraoral images and panoramic radiograph which were uploaded in the case history of each patient along with the tooth number.

Inclusion criteria

- Patients of more than 18 years of age.

Exclusion criteria

- Missing mandibular incisors due to trauma, extraction and orthodontic camouflage.
- Case sheets with improper/missing intraoral images and radiographs.

Statistical analysis

Collected data was tabulated and imported to Statistical Package for Social Science (SPSS, version 22, SPSS Inc. Chicago, IL, USA) for statistical analysis. Association of missing mandibular incisors at each position in the right and left quadrant of the mouth for all the patients was analyzed using the chi-square test. The differences in number of missing teeth and teeth number between gender in orthodontic and general population were compared.

RESULTS

From the study, the incidence of missing mandibular incisors among the orthodontic population is found to be in 16 patients (8.38%) and the general population 9 (1.11%). Females showed a higher incidence of congenitally missing mandibular incisors than males with 6.54% and 4.59% respectively (Figures 1-3).

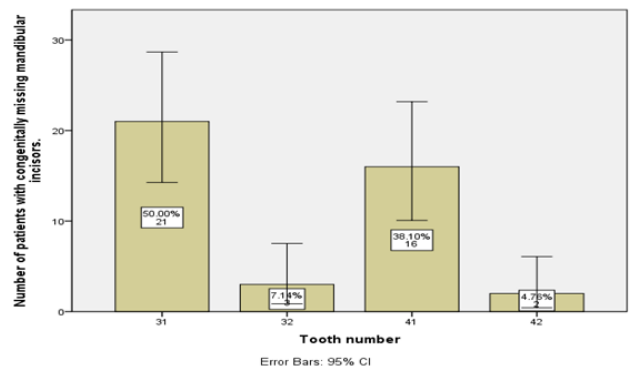


Figure 1: Graph shows the frequency of congenitally missing mandibular incisors. Tooth number 31 is reported to be most commonly missing mandibular incisors with 50% followed by 41 (38.1%), 32(7.1%) and 42 with the least percentage of 4.7%.

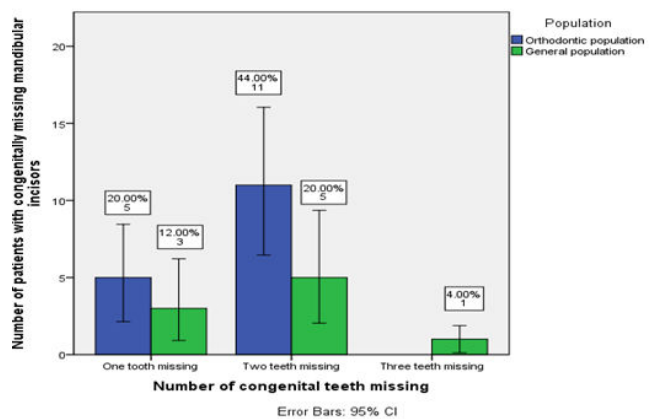


Figure 2: Graph shows the distribution of number of congenitally missing mandibular incisors among orthodontic and general population. In the orthodontic population, 20% of the individuals had lost one tooth, 44% had two lost teeth and no individuals with three missing teeth, whereas in the general population, 12% had lost one tooth, 20% had lost two teeth and 4% with three missing teeth. The correlation is found to be statistically significant with P<0.05.

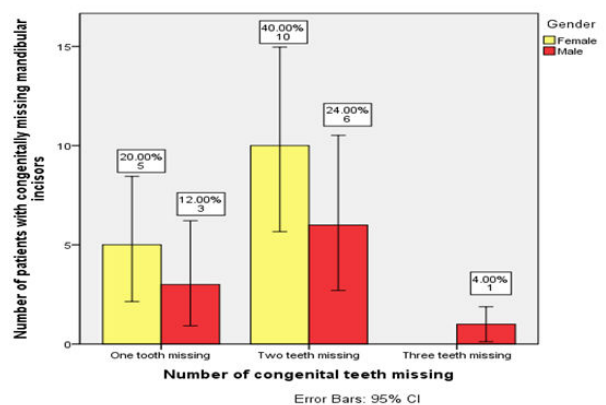


Figure 3: Graph shows the distribution of number of congenitally missing mandibular incisors among

males and females. Females showed a high incidence of one and two missing teeth (20% and 40%) compared to males (12% and 24%) with no statistical significance of $P > 0.05$.

DISCUSSION

Our results suggest that the congenitally missing mandibular incisors are found to be higher among the orthodontic population compared to the general population. The prevalence in the present study is found to be 8.38%. Similar results were obtained in a study conducted by Sterzik et al., with a prevalence rate of 8.1% among German orthodontic population [14]. In contrast, a study conducted by reported 0.3% prevalence in Jewish population [15] and a study conducted by concluded with 10.1% prevalence rate among Norwegian population which is slightly higher compared to the present study [3]. This wide range of variation can be due to the factors such as age, gender, sampling methods and clinical examination.

Females showed a higher incidence than males with 6.54% and 4.59% respectively. The result is in line compared to the other previous studies. A study conducted by at UK population at Iceland population and Nik-Hussein at Malaysian population reported higher prevalence of hypodontia in females than males [16-18]. However, some studies reported no differences were found when comparing the total prevalence of hypodontia between males and females [19-22]. The higher rates observed in females might be associated with biological differences such as smaller jaws which might trigger environmental factors. This might be confirmed by the suggestion that teeth might be absent also when the development of tooth germs is delayed and thus the required space has been compromised by the surrounding tissues [23]. Another factor that females show higher prevalence of congenitally missing mandibular incisors is due to higher requirement of orthodontic treatment and the higher values that society gives for aesthetics, particularly for females [24]. However the latter is not acceptable as most of the studies conducted among female school children have shown higher rates [25].

The number of missing teeth is found to be higher among the orthodontic population with predominantly one or two teeth missing compared to the general population. Tooth number 31 is found to be a highly predominant missing tooth followed by 41, 32 and 42. Mandibular central incisor is the most common congenitally missing tooth in the present study [31-41]. Interestingly, mandibular lateral incisor agenesis has a higher prevalence rate in Japanese orthodontic patients. Higher incidence of lateral incisor prevalence in samples of orthodontic patients could be explained by missing tooth's localization. Compromised esthetics may provoke anxiety among patients with missing anterior teeth that leads to an undeniable need for orthodontic treatment. Hence future studies must concentrate more on genetic traits causing congenital missing teeth. The prevalence should be estimated with larger samples to arrive at a

probability of getting affected with congenitally missing teeth among the related familial members.

Our team has extensive knowledge and research experience that has been translated into high quality publications [26-45].

CONCLUSION

Hypodontia is found considerably more frequent in mandibular incisors in orthodontic patients. The most frequent missing tooth is mandibular central incisors followed by lateral incisors. The majority of the patients had one or two missing teeth, seldom three. By early detection of congenitally missing mandibular incisors, the alternative treatment modalities can be planned accordingly in order to obtain a satisfactory permanent dentition and to reduce the complications of hypodontia.

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CONFLICT OF INTEREST

There was no potential conflict of interest.

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